New Trends and Future directions of ICT

Emotional Computing

- Emotional computing is about designing computers that can **understand, interpret, and respond to human emotions**.
- It is sometimes called **Affective Computing**.
- Machines use sensors, facial recognition, voice analysis, and other signals to detect emotions like happiness, stress, or frustration.
- Its goal to make technology more **human-centered**, enabling natural and empathetic interaction between people and computers.

  Examples:
  - Virtual assistants that adjust their tone when user sounds upset.
  - Cars that detect driver fatigue and alert them.
  - Mental health apps that track emotional states.

Intelligent Computing

- Intelligent computing refers to the use of computer systems that show **machine-level intelligence**, such as **reasoning, learning, decision-making, and adaptation**.
- It is closely linked to **Artificial Intelligence (AI)**.
- **Characteristics:**
  - **Reasoning** – solving problems logically.
  - **Learning** – improving performance from past data/experience.
  - **Adaptivity** – adjusting behavior when conditions change.
- **Techniques used:** Neural networks, genetic algorithms, expert systems, and machine learning.
- **Examples:**
  - Face/fingerprint recognition systems.
  - Self-driving cars.
  - Recommendation systems on Netflix or YouTube.

Artificial Intelligence

- Artificial Intelligence is the science and engineering of making computers perform tasks that normally require human intelligence.
  Ex: Some important AI Techniques are: Neural Network, Genetic Algorithm, and Expert Systems

Neural Network

- Neural Network are computational models inspired by an animal's central nervous systems (in particular the brain) which is capable of machine learning as well as pattern recognition.

There are three different types of layers

1. **Input Layer** – Receives raw data (e.g., images, text, numbers).
2. **Hidden Layers** – Process data by identifying **patterns and relationships**.
3. **Output Layer** – Produces the final decision (e.g., classifying a photo as "cat" or "dog").

Key Features

- **Learning from Data** – Improves performance as more data is provided.
- **Pattern Recognition** – Identifies trends or similarities that humans may miss.
- **Adaptability** – Can adjust to new inputs and evolving situations.

Applications

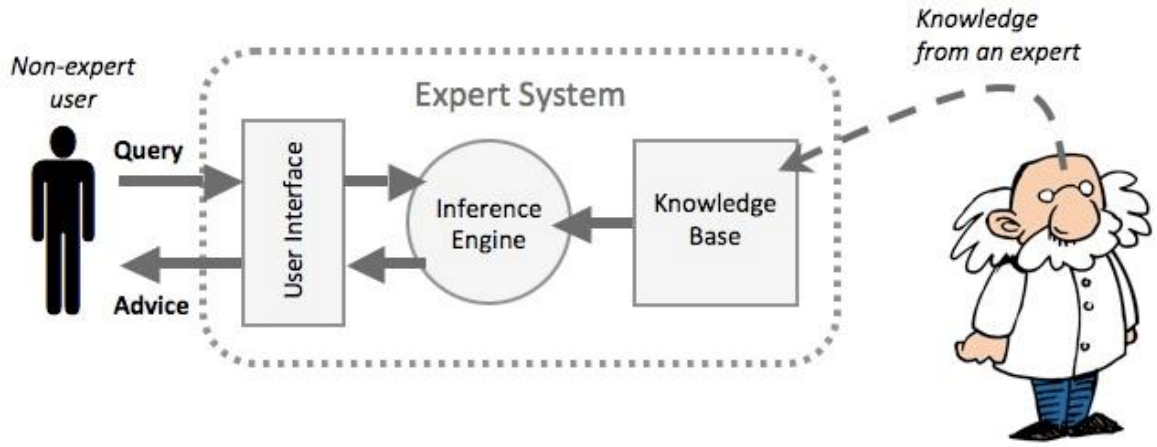
- Image & Face Recognition (security systems, social media tagging)
- Speech Recognition (Siri, Alexa, Google Assistant)
- Medical Diagnosis (detecting cancer from scans)
- Financial Forecasting (stock market predictions)
- Autonomous Vehicles (self-driving car perception systems)

Expert System

An expert system is computer software that attempts to act like a human expert on a particular subject area.

An expert system is made up of three parts:

- A user interface - This is the system that allows a non-expert user to query (question) the expert system, and to receive advice.
- A knowledge base - This is a collection of facts and rules. The knowledge base is created from information provided by human experts
- An inference engine - This acts rather like a search engine, examining the knowledge base for information that matches the user's query.



Artificial

Intelligence Software vs. Conventional Software

- Conventional computer software follows a logical series of steps to reach a conclusion
- Computer programmers originally designed software that accomplished tasks by completing algorithms
- AI software uses the techniques of search and pattern matching
- Programmers design AI software to give the computer only the problem, not the steps necessary to solve it

Pros and Cons of Artificial Intelligence

Pros

Ability to simulate human behavior and cognitive processes

Capture and preserve human expertise

Fast Response.

The ability to comprehend large amounts of data quickly.

Cons

No common sense

Cannot readily deal with mixed knowledge

May have high development costs

Raise legal and ethical concerns

Kansei System

An consumer oriented technology for new product development based on consumer Kansei (psychological image and feeling)

Working with the three levels

- Visceral design : Appearance
- Behavioral : Pleasure and effectiveness of use
- Reflective: Self esteem and status

Man-Machine Coexistence

The word coexistence can be broken into two parts, co- and -exists.The prefix co- means together and -exist means to be or to live.

Therefore, coexistence means being or living together Coexistence also has another connotation - peaceful coexistence.

It means more than being in the same place at the same time, getting along with each other.

Exploring the basics and applications of agent technology

What is an agent system?

.....

.....

.....

What are the types of classifications of representatives based on the tasks they perform?

.....

.....

.....

.....

.....

.....

.....

What are the characteristics of software agents?

What are the types of software agents according to functionality?

What is a multi agent system?

What are the characteristics of multi agent system?

What are the types of multi agents?

What are the applications of multi agent system?

What is an evolutionary computing?

What are the basic concepts of evolutionary computing?

What is ubiquitous computing?